

CLAIMS

We claim:

1. A spindle motor comprising:
a rotatable component defining a journal gap and relatively rotatable with a stationary component;
a recirculation path formed through one of the stationary component and the rotatable component for recirculating fluid through the journal gap; and
a first thrust surface extending substantially radially, formed on one of the stationary component and the rotatable component, and formed between the recirculation path and the journal gap.
2. The spindle motor as in claim 1, further comprising an asymmetric grooved pattern forming a journal bearing formed on at least one of the adjacent surfaces of the stationary component and the rotatable component, adjacent to the journal gap.
3. The spindle motor as in claim 1, further comprising a grooved pattern consisting of a symmetric grooved pattern forming a journal bearing formed on at least one of the adjacent surfaces of the stationary component and the rotatable component, adjacent to the journal gap.
4. The spindle motor as in claim 3, wherein axial span between journal bearings is increased a length in the range of 10% to 20% as compared to a journal having an asymmetric grooved pattern bearing, and wherein axial length of the journal remains unchanged.
5. The spindle motor as in claim 3, wherein axial length of the journal is decreased a length in the range of 10% to 20% as compared to a journal having an asymmetric grooved pattern bearing.
6. The spindle motor as in claim 1, wherein the first thrust surface comprises a grooved surface that generates an offset pressure through the journal gap and the recirculation path to avoid subambient pressure throughout the journal, and wherein the first thrust surface is biased

for creating a pressure gradient and substantially circulating the fluid about the journal, and purging air from the fluid.

7. The spindle motor as in claim 1, further comprising a stator, affixed to the stationary component, for interacting with a magnet affixed to the rotatable component and driving the rotatable component, wherein the first thrust surface is positioned to generate a first axial force that opposes a second axial force generated by interaction of the stator and the magnet.

8. The spindle motor as in claim 7, further comprising a second thrust surface extending substantially radially and positioned between the rotatable component and the stationary component at an axial end of the rotatable component, wherein the second thrust surface generates a third axial force in the same direction as the first axial force generated by the first thrust surface, the first axial force and the third axial force opposing the second axial force generated by interaction of the stator and the magnet.

9. A spindle motor for incorporation into a disc drive storage system comprising:
a rotatable component defining a journal gap and relatively rotatable with a stationary component;
a data storage disc attached to the rotatable component;
a recirculation path formed through one of the stationary component and the rotatable component for recirculating fluid through the journal gap; and
a first thrust surface extending substantially radially, formed on one of the stationary component and the rotatable component, and formed between the recirculation path and the journal gap.

10. The spindle motor as in claim 9, further comprising a grooved pattern consisting of a symmetric grooved pattern forming a journal bearing formed on at least one of the adjacent surfaces of the stationary component and the rotatable component, adjacent to the journal gap.

11. The spindle motor as in claim 10, wherein axial span between journal bearings is increased a length in the range of 10% to 20% as compared to a journal having an asymmetric grooved pattern bearing, and wherein axial length of the journal remains unchanged.
12. The spindle motor as in claim 10, wherein axial length of the journal is decreased a length in the range of 10% to 20% as compared to a journal having an asymmetric grooved pattern bearing.
13. The spindle motor as in claim 9, wherein the first thrust surface comprises a grooved surface that generates an offset pressure through the journal gap and the recirculation path to avoid subambient pressure throughout the journal, and wherein the first thrust surface is biased for creating a pressure gradient and substantially circulating the fluid about the journal, and purging air from the fluid.
14. The spindle motor as in claim 9, further comprising a stator, affixed to the stationary component, for interacting with a magnet affixed to the rotatable component and driving the rotatable component, wherein the first thrust surface is positioned to generate a first axial force that opposes a second axial force generated by interaction of the stator and the magnet.
15. The spindle motor as in claim 14, further comprising a second thrust surface extending substantially radially and positioned between the rotatable component and the stationary component at an axial end of the rotatable component, wherein the second thrust surface generates a third axial force in the same direction as the first axial force generated by the first thrust surface, the first axial force and the third axial force opposing the second axial force generated by interaction of the stator and the magnet.
16. A method comprising:
defining a journal gap between a relatively rotatable component and a stationary component;

forming a recirculation path through one of the stationary component and the rotatable component for recirculating fluid through the journal gap; and

forming a first thrust surface between the recirculation path and the journal gap, extending substantially radially on one of the stationary component and the rotatable component.

17. The method as in claim 16, further comprising forming a journal bearing having an asymmetric grooved pattern on at least one of the adjacent surfaces of the stationary component and the rotatable component, adjacent to the journal gap.

18. The method as in claim 16, further comprising forming a journal bearing having a grooved pattern consisting of a symmetric grooved pattern on at least one of the adjacent surfaces of the stationary component and the rotatable component, adjacent to the journal gap.

19. The method as in claim 18, further comprising increasing axial span between journal bearings a length in the range of 10% to 20% as compared to a journal having an asymmetric grooved pattern bearing, wherein axial length of the journal is unchanged.

20. The method as in claim 18, further comprising decreasing axial length of the journal a length in the range of 10% to 20% as compared to a journal having an asymmetric grooved pattern bearing.

21. The method as in claim 16, further comprising generating an offset pressure through the journal gap and the recirculation path to avoid subambient pressure throughout the journal, utilizing a grooved first thrust surface, and biasing the first thrust surface to create a pressure gradient and to substantially circulate the fluid about the journal and purge air from the fluid.

22. The method as in claim 16, further comprising positioning the first thrust surface to generate a first axial force that opposes a second axial force generated by interaction of a stator and a magnet, wherein the stator is affixed to the stationary component and the magnet is affixed to the rotatable component for driving the rotatable component.

23. The method as in claim 22, further comprising positioning and extending substantially radially a second thrust surface between the rotatable component and the stationary component at an axial end of the rotatable component to generate a third axial force from the second thrust surface in the same direction as the first axial force, wherein the first axial force and the third axial force oppose the second axial force.